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JAMES E. LOTAN

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PHOTO SERIES FOR APPRAISING THINNING SLASH IN NORTH IDAHO

Western Hemlock,
Grand Fir, and
Western Redcedar Timber Types

Wayne H. Koski
William C. Fischer



A COOPERATIVE
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INTERMOUNTAIN FOREST AND RANGE EXPERIMENT STATION
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RESEARCH SUMMARY

Three series of color photographs show different levels of down woody material resulting from precommercial thinning operations in three north Idaho timber types. Each photo is supplemented by inventory data describing the size, weight, and volume of the debris pictured. Stand data relating to the thinning operation are provided and estimates of predicted fire behavior and Idaho Forest Practice Act slash hazard rating are given.

Instructions for using the photos to describe precommercial thinning slash and to evaluate potential fire hazard are provided.

JAMES E. LOTAN

ACKNOWLEDGMENTS

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For uniformity and user convenience, the format of this publication is patterned after the photo series for quantifying forest residues recently produced by the USDA Forest Service, Pacific Northwest Forest and Range Experiment Station (Maxwell and Ward 1976a, 1976b).

USDA Forest Service
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the State of Idaho

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PLANT SPECIES CITED

western hemlock	<i>Tsuga heterophylla</i> (Ref.) Sarg.
western redcedar	<i>Thuja plicata</i> Donn.
grand fir	<i>Abies grandis</i> (Dongl.) Lindl.
western larch	<i>Larix occidentalis</i> Nutt.
Douglas-fir	<i>Pseudotsuga menziesii</i> (Mirb.) Franco
western white pine	<i>Pinus monticola</i> Dougl.
Engelmann spruce	<i>Picea engelmannii</i> Parry

METRIC CONVERSIONS AND ABBREVIATION OF UNITS

inches (in) x 2.54	=	centimeters (cm)
feet (ft) x 0.3048	=	meters (m)
square feet (ft ²) x 0.092903	=	square meters (m ²)
cubic feet (ft ³) x 0.02832	=	cubic meters (m ³)
acres (ac) x 4046.87	=	square meters (m ²)
x 0.4047	=	hectares (ha)
square feet/acre (ft /ac) x 0.22956	=	square meters/hectare (m /ha)
cubic feet/acre (ft /ac) x 0.06997	=	cubic meters/hectare (m /ha)
tons/acre (T/ac) x 2.2416	=	metric tons/hectare (T/ha)
x 0.22417	=	kilograms/square meter (kg/m)
miles/hour (mi/h) x 1.7093	=	kilometers/hour (km/h)
chains/hour (ch/h) x 20.1168	=	meters/hour (m/h)
British thermal units/foot/second		
(Btu/ft/s) x 3.4592	=	kilowatts/meter (kw/m)

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PURPOSE OF PHOTO SERIES

Thinning slash is the woody debris dropped on the forest floor during cuttings to reduce stocking in young forest stands--a practice commonly called "precommercial thinning." This debris is made up of stems, branches, twigs, and needles of the trees cut during the thinning operation. The thinning slash is laid down over the woody debris that has accumulated over the life of the stand, either from natural events or from previous forestry operations. Together, the accumulated debris and the slash can create a hazardous fuel situation that must be dealt with by the fire manager.

The purpose of this photo series is to help the forest manager determine the fire hazard associated with thinning slash and decide if treatment is needed. The photos show different slash fuel situations created as a result of precommercial thinning in three timber types common in north Idaho.

The fuel complex shown in each photo is described on an accompanying data sheet in terms of:

1. Physical characteristics.
2. The stand and its thinning prescription.
3. Potential fire behavior.
4. Idaho Forest Practice Act slash hazard rating.

We propose that the manager use these photos to evaluate similar slash situations, thereby saving the cost of field inventory and data analysis.

The most important reason for evaluating thinning slash is to decide if the slash presents an unacceptable fire hazard to the selected crop trees or to the surrounding forest area. If the hazard is judged unacceptable, the photos can be used to decide the amount and type of treatment, the priority of treatment among several areas, and the amount of protection needed until hazard has been abated.

Because the photos show the results of different thinning prescriptions, they can be useful for planning thinning operations. Undesirable thinning prescriptions can be recognized in advance of cutting and avoided by changing the prescription, planning fuel reduction as a part of the thinning operation, or selecting different areas for thinning. As a planning aid, the photos are best used in conjunction with other precutting planning aids such as debris prediction and hazard appraisal procedures suggested by Albini and others (1977), by Brown and others (1977), and by Koski (1977a, 1977b). For example, the debris prediction technique developed by Brown and others (1977), predicts the amount of slash that will result from a planned thinning. The only information needed is the number of trees to be cut by species and size class. This photo series can be used to visualize the slash loads predicted with Brown's technique and can provide a basis for discussing appropriate fuel management actions.

USING THE PHOTOS

Describing the Fuel Complex

Two important characteristics of the fuel complex can be seen in each photo: (1) The weight of fuel in the different diameter classes, and (2) the percentage of ground covered by fuel. Consequently, the manager can use the photos to estimate rough values for these characteristics of thinning slash. Fuel depth can be estimated from the black and white pole of the plot marker. Each black and white section is 1 foot (0.3048 m).

To use the photos to describe thinning slash, simply inspect the fuel complex and then select the photo that most nearly compares with what is seen on the ground. Then use the information on the data sheet to describe the fuel complex.

Perhaps no one photo adequately represents the actual situation. If this is the case, select two successive photos that bracket the observed fuel complex and then interpolate between the values on the data sheets accompanying the selected photos.

Rather than try to select one photo, or a pair of photos that best reflect the entire fuel complex, the user can describe each of the three above-mentioned characteristics separately. This can be done by using the following procedure suggested by Maxwell and Ward (1976a, 1976b):

1. Observe each of the characteristics of the fuel complex on-the-ground (loading by size class, and percentage of ground covered).
2. For each characteristic, select the photo that most nearly matches, or photos that bracket the observed situation.
3. For each characteristic, obtain a value from the data sheet accompanying the selected photo (or interpolate a value if a pair of photos was selected).

On large areas of slash, zones of different slash loadings are often apparent. In such cases each zone should be described and evaluated separately. The results can then be weighted and cumulated for the whole area.

Some characteristics of the fuel complex, especially those associated with the accumulated debris, cannot be easily observed from the photo. If needed, values for such characteristics as the size and condition of larger woody material must be taken "on faith" from the data sheet accompanying the selected photo or obtained from field sampling or observation.

Appraising Potential Fire Behavior

The data sheet for each photo contains potential fire behavior values for the pictured fuel complex. The fire behavior predictions are based on the measured fuel loadings for each stand. Low fuel moisture is assumed; 0-0.25 inch (0-0.64 cm) diameter, fuel moisture content = 5 percent. Predictions are given for three different 20-foot (6.1-m) windspeeds; 0, 10, and 20 mi/h (0, 16.1, and 32.2 km/h); and three slash ages (1, 3, and 5 years after cutting). Because actual slope is not evident in the photos, 20 percent slope is assumed for all stands. The wind and resulting fire spread are assumed to be upslope. The fuel is assumed to be spread uniformly over the site. The differences between predicted fire behavior between years 1 and 3, and years 3 and 5, represent the effect of needle fall and settling of the slash over time.

Six different expressions of fire behavior are shown on the data sheet. A description of each follows, along with comparative values and other aids to help the user interpret them (Albini and others 1977).

1. *Head fire rate of spread (ch/h).*--The values under this heading are maximum rates, rounded to the nearest ch/h; the wind is blowing directly upslope, and the fire is advancing upslope. For comparison purposes, note the following equivalent rates of progress:

- 1 ch/h (about 20 m/h) is about the rate of fireline construction for one man using hand tools in medium fuels (medium resistance to control).
- 10 ch/h (about 200 m/h) is about the rate of fireline construction for a bulldozer working in fuels of extreme resistance to control.
- 100 ch/h (about 2,000 m/h) is about the speed of a leisurely stroll on level terrain or a good average pace for backpacking in medium to steep terrain.

2. *Perimeter growth rate (ch/h).*--Under the conditions cited above, this value is an estimate of the rate of increase in the length of a smooth elliptical outline marking the advancing edge of a fire started at a point (a spotfire) in the slash. The perimeter growth rate can be viewed as a rough indication of the minimum total line-building rate required to contain a fire.

3. *Area burned in 1 hour (acres).*--This value tells the area burned after 1 hour. The value can be used to predict how long a fire that starts in the slash will stay in the slash. Burned area increases with the square of the burning time. To predict the time a fire would stay in the thinning unit, divide half the area of the thinning unit by the area burned in 1 hour and take the square root. The result will be the time, in hours, that one could expect the fire to be burning mostly in the thinning slash. After this period of time, a fire started in the unit would probably have burned out of it into adjacent fuels.

4. *Head fire flame length (feet).*--This is the length of flame from the center of the flaming zone at the upper surface of the slash to the tip of the flame. This dimension, with no wind, will be the

vertical flame height: In most cases, wind will tilt the flame and the flame length will be the slant distance. Guides for interpreting flame length are included under item 6, below.

5. *Crown scorch height due to head fire (feet).*--Crown scorch height is calculated from Byram's intensity (see item 6 below). The scorch height value represents the height at which a lethal temperature of 140°F (60°C) or greater is reached above a spreading head fire. Values are rounded to the nearest foot and assume an ambient temperature of 77°F (25°C). Although it is possible to adjust for other ambient temperatures (Albini 1976b), the accuracy of the estimate in itself does not warrant such a refinement. Lethal scorching implies that the tissue is killed; the scorched needles will turn brown within a few weeks. Cambium kill due to heating alone (with or without crown scorch) is not provided in this assessment. Thus, the user should be aware that tree kill may be underestimated if only crown scorch is considered.

6. *Byram's intensity for the head fire (Btu/ft/s).*--This quantity represents the rate of heat release per foot of fire edge at the head of the running fire. It has been used to describe the difficulty of controlling a fire. The list that follows shows numerical values and associated descriptions that may help to interpret this quantity. The flame length (item 4, above) derived for each intensity from Byram's formula is also shown.

<i>Byram's intensity</i>	<i>Flame length</i>	<i>Fire situation</i>
≤ 5 Btu/ft/s (≤ 17 kw/m)	≤ 1 ft (0.3 m)	Marginal burning. Few fires exist at this level.
20 - 50 Btu/ft/s (69 - 173 kw/m)	2 - 3 ft (0.6 - 0.9 m)	Easily attacked and controlled. People can work right up to the edge of the fire without extra protection.
100 Btu/ft/s (346 kw/m)	4 ft (1.2 m)	This is about the limit beyond which people are unable to work at the fire edge. Direct attack with hand crews may be difficult.

6. (con.)

500 - 700 Btu/ft/s (1,730 - 2,421 kw/m)	8 - 9 ft (2.4 - 2.7 m)	Spotting becomes a problem and the limit of direct attack is probably reached in this range of intensities.
1,000 Btu/ft/s (3,459 kw/m)	11 ft (3.4 m)	Crowning can be expected to begin. Serious spotting may occur.
20,000 - 30,000 Btu/ft/s (69,184 - 103,800 kw/m)	40 - 50 ft (12.2 - 15.1 m)	Major conflagration. Long-range spotting occurs; tree blowdown may occur. Flaming zone depths of up to 1/4 mile (0.4 km) can arise, so the flame length formula is not very useful here.

The values predicted for various fire parameters are only approximations, but nevertheless provide a valuable estimate of fire behavior under comparable conditions.

Rating Slash Hazard

The Idaho Forest Practice Act (State of Idaho 1977) requires that planned thinning operations be evaluated by use of a slash hazard rating system that assigns points for various hazard characteristics and deducts points for ameliorating factors. If the total points assigned to a planned thinning project exceed a specified value, the project must be modified and slash disposal or other hazard abatement practices must be included in the plan. Hazard characteristics to which points are assigned are predicted fuel quantity, size of area, slope and aspect, prethinning stand and fuel situation, and time of year work is planned. Offsetting factors include planned slash disposal and treatment, fire and fuelbreak construction, access, availability of water, suppression capability, and special detection and prevention measures.

Fuel quantity as used in the Act, refers to the fuel created as a result of thinning. It does not include fuel that was on the ground before thinning. Up to 60 hazard points can be assigned to a planned thinning for fuel quantity. The exact score depends on the number of trees to be cut and their average diameter. Included in the Act is a hazard table that tells the number of hazard points for fuel quantity for any given combination of average diameter and number of trees to be cut.

Fuel quantity hazard points are given for each photo. Consequently, raters can use the photos to help visualize the relationship between the size and number of stems cut, the resulting fuel load, and the slash hazard points for fuel quantity. The rater must remember, however, that the fuel quantity slash hazard points are only a part of the total points assigned to a precommercial thinning. Other hazard points for slope and aspect, area size, and natural fuel quantities must also be evaluated to obtain total hazard points.

PHOTO SERIES DEVELOPMENT

This photo series is an example of how current research can be applied to a specific management problem. The tasks involved in developing this photo series and the sources of information are as follows:

1. The areas photographed were selected to represent different fuel loading levels typical of precommercial thinning slash in western hemlock, grand fir, and western redcedar stands in north Idaho.
2. Sample plots were laid out and photographed in accordance with procedures suggested by USDA Forest Service (1975) and by Fischer.¹
3. Fuels were described by using field inventory and computation techniques developed by Brown (1974).

¹Fischer, William C. 1977. Progress report: Fire potential rating technique for fuel management planning guidelines. 13 p. North. For. Fire Lab., Missoula, MT 59806.

4. Information describing the precommercial thinning prescription was obtained from stand data in the project files.
5. Potential fire behavior was assessed using fire modeling techniques developed by Rothermel (1972) and Albini (1976a) and fuel appraisal techniques developed by Brown (1977).
6. Slash hazard points for fuel quantity are based on the guidelines contained in Rule 817.03, Idaho Forest Practice Act, Title 38, Chapter 13, Idaho Code.

PHOTO SERIES CODING

This booklet is arranged so that a photo and the corresponding data sheet are on facing pages. When positioned for viewing, the photo is on the top and the data sheet on the bottom. Both photo and corresponding data sheet have the same code. The code is patterned after the one used by Maxwell and Ward (1976a, 1976b). The code shows:

- a. Order or rank, from lightest loading to heaviest loading, in the series of photographs.
1 = lightest load in each forest type series.
- b. Forest type, e.g., WH = western hemlock, GF = grand fir, WC = western cedar, WL = western larch, WWP = western white pine, ES = Engelmann spruce, DF = Douglas-fir.
- c. Forest size class, where: 1 = < 6-inch (< 15.24-cm) d.b.h.
- d. Cutting practice, where: TH = precommercial thinning.

Example: 1-WH-1-TH is the first photo in the series of western hemlock, < 6-inch (< 15.24 cm) diameter trees, precommercial thinning.

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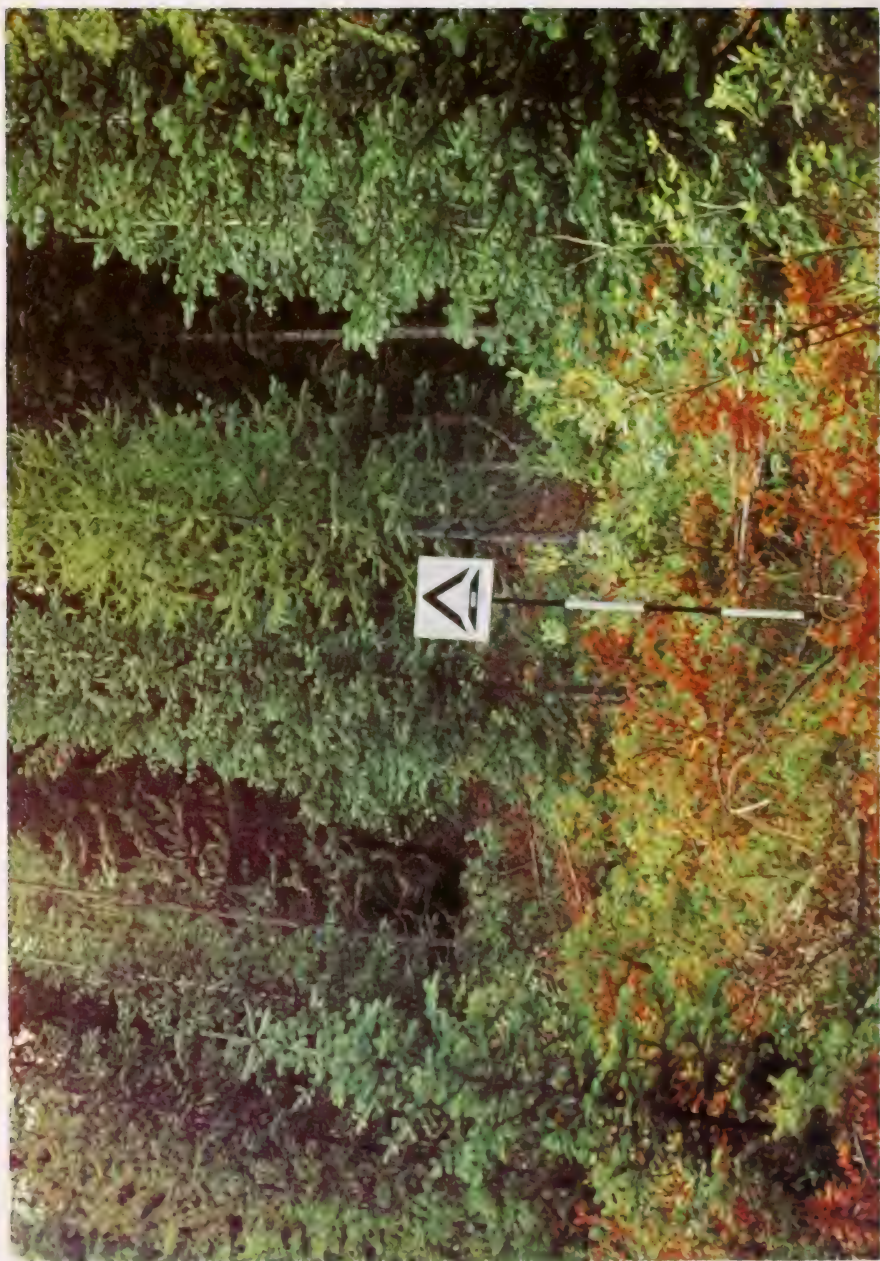
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WESTERN HEMLOCK SIZE CLASS 1 PRECOMMERCIAL THINNING

Reminders to users:

1. The marker in these photos is 1 foot (0.3048 m) square, and the pole is painted in contrasting colors at 1-foot (0.3048-m) intervals to provide scale.
2. Stumps are not included in debris quantities.
3. Rotten debris is that which would come apart or splinter when kicked.
4. Potential fire behavior is for low fuel moisture and 20% slope.
5. Windspeed is taken at 20 feet (6.1 m) above the ground.



1-WH-1-TH

DATA SHEET

CODE: 1-WH-1-TH

DEBRIS LOADING		UTILIZATION POTENTIAL OF DEBRIS LARGER THAN 3-INCH DIAMETER		POTENTIAL FIRE BEHAVIOR ASSESSMENT				
Size Class (inches)	Weight (tons/acre) Slash : Total Only : Debris	619 ft ³ /ac (43.3 m ³ /ha)		Quantity Assessed	Wind mi/h	Slash Age In No. Of Winters		
		Volume	Percent sound			1	3	5
0-0.25	0.8 : 0.8		0 %	Head fire	0	1	0.5	0.3
0.25-1.0	0.9 : 0.9			Spread rate (ch/h)	10	22	10	5
1.1-3.0	1.8 : 2.0		100 %		20	73	29	13
3.1-10.0	0 : 5.8			Perimeter	0	4	2	1
10.1-20.0	0 : 0			Growth rate (ch/h)	10	41	10	5
20.1+	0 : 0				20	41	10	5
		sound	-- in	Burned area After 1 h	0	0.1	0.03	0.01
		Sound & rotten	6.4 in (16.3 cm)	(acres)	10	8	0.5	0.1
					20	8	0.5	0.1
				Head fire	0	0.6	0.4	0.4
				Flame length (feet)	10	3	2	1
					20	5	3	2
				Crown scorch	0	2	1	0.7
				By head fire	10	3	1	0.5
				(feet)	20	4	1	0.5
				Head fire	0	2	1	0.6
				Intensity (Btu/ft/s)	10	48	16	10
					20	159	47	26

PRECOMMERCIAL THINNING INFORMATION	
Stems cut/acre	2354 (Avg. d.b.h. 1")
Stems remaining per acre	436
Average d.b.h. before (inches)	1
Average d.b.h. after (inches)	4
Basal area/acre before	63
Basal area/acre after	38
Thinning method	Chainaw
Slash treatment	None

OTHER INFORMATION	
Slash age	3 months
Average slope	50 percent
Species composition:	WH 50%, WL 50%

IDAHO FOREST PRACTICE ACT

SLASH HAZARD POINTS

FUEL QUANTITY 10



2-WH-1-TH

DATA SHEET

CODE: 2-WH-1-TH

DEBRIS LOADING		UTILIZATION POTENTIAL OF DEBRIS LARGER THAN 3-INCH DIAMETER		POTENTIAL FIRE BEHAVIOR ASSESSMENT					
Size Class (inches)	Weight (tons/acre)	Volume		Quantity Assessed	Wind mi/h	Slash Age In No. Of Winters			
		Slash : Total Only : Debris	Percent sound			Percent rotten	Avg. diameter:	1	3	5
0-0.25	2.2 : 2.2		0 %	Head fire	0	1	1	0.7	
0.25-1.0	3.4 : 4.1			Spread rate (ch/h)	10	30	15	9	
1.1-3.0	7.9 : 10.1		100 %	.....	20	96	44	20
3.1-10.0	0.1 : 2.8			Perimeter	0	6	4	3	
10.1-20.0	0 : 27.8			Growth rate (ch/h)	10	79	40	22	
20.1+	0 : 0			.....	20	220	74	36
								
				Burned area	0	0.3	0.1	0.1	
				After 1 h	10	31	8	2	
				(acres)	20	95	11	3	
								
				Head fire	0	1	1	1	
				Flame length	10	5	3	3	
				(feet)	20	8	6	5	
								
				Crown scorch	0	4	3	3	
				By head fire	10	13	5	4	
				(feet)	20	18	6	4	
								
				Head fire	0	9	5	5	
				Intensity	10	185	82	62	
				(Btu/Ft/s)	20	584	236	148	

PRECOMMERCIAL THINNING INFORMATION	
Stems cut/acre	7900 (Avg. d.b.h. 1")
Stems remaining per acre	436
Average d.b.h. before (inches)	1
Average d.b.h. after (inches)	2
Basal area/acre before	53
Basal area/acre after	10
Thinning method	Chainsaw
Slash treatment	None

OTHER INFORMATION	
Slash age	12 months
Average slope	60 percent
Species composition: WH 80%, GF 20%	

IDAHO FOREST PRACTICE ACT SLASH HAZARD POINTS
FUEL QUANTITY 32



DATA SHEET

CODE: 3-WH-1-TH

DEBRIS LOADING			UTILIZATION POTENTIAL OF DEBRIS LARGER THAN 3-INCH DIAMETER		POTENTIAL FIRE BEHAVIOR ASSESSMENT							
Size Class (inches)	Weight (tons/acre)		Volume 5104 $\frac{\text{ft}^3}{\text{ac}}$ (357.1 $\frac{\text{m}^3}{\text{ha}}$)	Percent sound 3 %	Percent rotten 97 %	Avg. diameter: sound 3.4 in (8.6 cm)	Sound & rotten 8.6 in (21.8 cm)	Quantity Assessed	Wind mi/h	Slash Age In No. Of Winters		
	Slash : Total Only : Debris	1								3	5	
0-0.25	2.7	2.7						Head fire	0	2	1	1
0.25-1.0	3.5	3.5						Spread rate (ch/h)	10	53	24	13
1.1-3.0	8.5	8.6							20	172	72	34
3.1-10.0	1.2	18.3						Perimeter	0	10	5	4
10.1-20.0	0	16.0						Growth rate (ch/h)	10	137	62	34
20.1+	0	13.8							20	393	142	66
TOTAL (kg/m ²)	15.9	62.9 (3.56) ; (14.10)						Burned area After 1 h (acres)	0	1	0.2	0.1
PRECOMMERCIAL THINNING INFORMATION												
Stems cut/acre	2836 (Avg. d.b.h. 2")											
Stems remaining per acre	436											
Average d.b.h. before (inches)	2											
Average d.b.h. after (inches)	4											
Basal area/acre before	100											
Basal area/acre after	38											
Thinning method	Chainsaw											
Slash treatment	None											
OTHER INFORMATION												
Slash age	4 months											
Average slope	30 percent											
Species composition:	WH 100%											

IDAHO FOREST PRACTICE ACT
 SLASH HAZARD POINTS
 FUEL QUANTITY 41



DATA SHEET

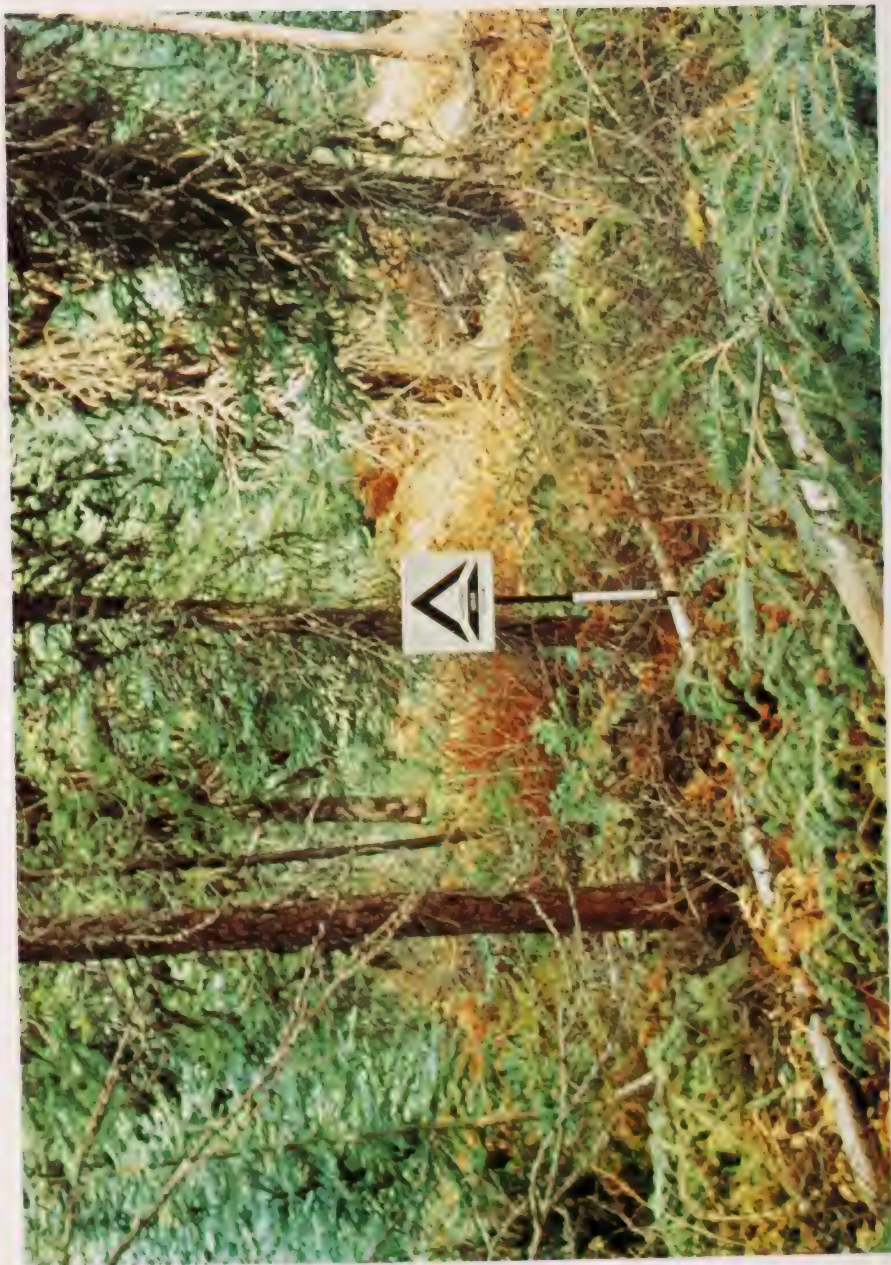
CODE: 4-WH-1-TH

DEBRIS LOADING			UTILIZATION POTENTIAL OF DEBRIS LARGER THAN 3-INCH DIAMETER		POTENTIAL FIRE BEHAVIOR ASSESSMENT					
Size Class (inches)	Weight (tons/acre)		Volume 6455 ft ³ /ac (451.7 m ³ /ha)	Percent sound 10 %	Percent rotten 90 %	Avg. diameter:	Quantity Assessed	Wind mi/h	Slash Age In No. Of Winters	
	Slash : Total	Only : Debris							1	3	5
0-0.25	4.3	4.3					Head fire	0	2	1
0.25-1.0	6.6	6.6					Spread rate (ch/h)	10	41	19
1.1-3.0	16.0	17.5						20	132	55
3.1-10.0	0.6	6.0					Perimeter	0	9	5
10.1-20.0	0	50.5					Growth rate (ch/h)	10	107	49
20.1+	0	4.7						20	303	125
										46
							Burned area	0	1	0.2
							After 1 h	10	57	12
							(acres)	20	180	31
										4
							Head fire	0	2	1
							Flame length	10	7	4
							(feet)	20	12	7
										5
							Crown scorch	0	7	4
							By head fire	10	26	8
							(feet)	20	39	10
										5
							Head fire	0	18	7
							Intensity	10	363	123
							(8tu/ft/s)	20	1161	358
										176

PRECOMMERCIAL THINNING INFORMATION	
Stems cut/acre	4627 (Avg. d.b.h. 2")
Stems remaining per acre	436
Average d.b.h. before (inches)	2
Average d.b.h. after (inches)	4
Basal area/acre before	139
Basal area/acre after	38
Thinning method	Chainsaw
Slash treatment	None

OTHER INFORMATION	
Slash age	4 months
Average slope	0 percent
Species composition:	WH 100%

IDAHO FOREST PRACTICE ACT SLASH HAZARD POINTS
FUEL QUANTITY 58



5-WH-1-T-H

DATA SHEET

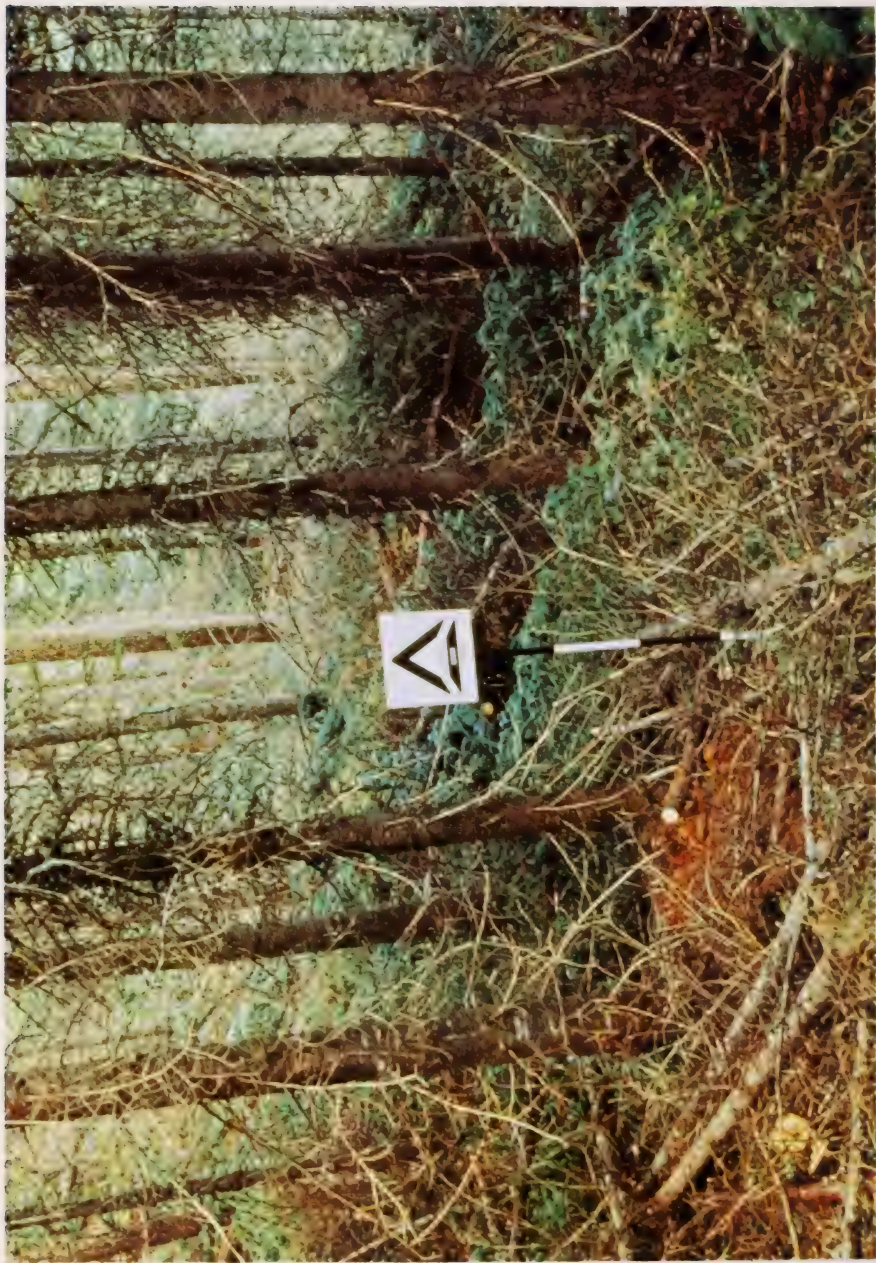
CODE: 5-WH-1-TH

DEBRIS LOADING			UTILIZATION POTENTIAL OF DEBRIS LARGER THAN 3-INCH DIAMETER		POTENTIAL FIRE BEHAVIOR ASSESSMENT							
Size Class (inches)	Weight (tons/acre)		Volume $\frac{1764 \text{ ft}^3/\text{ac}}{(123.4 \text{ m}^3/\text{ha})}$	Percent sound 20 %	Percent rotten 80 %	Avg. diameter: sound 3.3 in (8.4 cm)	Sound & rotten 5.3 in (13.5 cm)	Quantity Assessed	Slash Age In No. Of Winters			
	Slash : Total	Only : Debris							Wind mi/h	1	3	5
0-0.25	5.2	5.2						Head fire	0	2	1	0.7
0.25-1.0	5.1	5.1						Spread rate (ch/h)	10	49	22	10
1.1-3.0	13.2	13.2							20	179	66	26
3.1-10.0	3.5	9.5						Perimeter	0	11	5	3
10.1-20.0	0	2.3						Growth rate (ch/h)	10	141	56	26
20.1+	0	5.6							20	409	150	43
								Burned area After 1 h (acres)	0	1	0.2	0.1
									10	98	15	3
									20	329	44	4
								Head fire	0	2	1	1
								Flame length (feet)	10	8	4	3
									20	14	7	5
								Crown scorch	0	8	4	3
								By head fire (feet)	10	38	9	4
									20	61	12	4
								Head fire	0	24	7	4
								Intensity (Btu/ft/s)	10	532	132	60
									20	1745	400	157

PRECOMMERCIAL THINNING INFORMATION	
Stems cut/acre	5015 (Avg. d.b.h. 2")
Stems remaining per acre	436
Average d.b.h. before (inches)	2
Average d.b.h. after (inches)	4
Basal area/acre before	147
Basal area/acre after	38
Thinning method	Chainsaw
Slash treatment	None

OTHER INFORMATION	
Slash age	4 months
Average slope	50 percent
Species composition: GF 40%, WL 30%, WH 20%, ES 10%	

IDAHO FOREST PRACTICE ACT SLASH HAZARD POINTS
FUEL QUANTITY 60



6-WH-1-TH

DATA SHEET

CODE: 6-WH-1-TH

DEBRIS LOADING			UTILIZATION POTENTIAL OF DEBRIS LARGER THAN 3-INCH DIAMETER		POTENTIAL FIRE BEHAVIOR ASSESSMENT				
Size Class (inches)	Weight (tons/acre)	Slash : Total Only : Debris	Volume 2230 ft ³ /ac (156.0 m ³ /ha)		Quantity Assessed	Wind mi/h	Slash Age In No. Of Winters 1 3 5		
0-0.25	4.9 : 4.9	4.9 : 4.9			Head fire	0	2	1	0.6
0.25-1.0	4.9 : 4.9	4.9 : 4.9	Percent sound 44 %		Spread rate (ch/h)	10	50	20	9
1.1-3.0	11.1 : 11.4	11.1 : 11.4	Percent rotten 56 %			20	165	59	23
3.1-10.0	4.2 : 17.3				Perimeter	0	10	4	
10.1-20.0	0 : 6.2				Growth rate (ch/h)	10	130	51	3
20.1+	0 : 0					20	377	119	32
			sound 3.5 in (8.9 cm)						
			Sound & rotten 4.5 in (11.4 cm)						
TOTAL tons/acre (kg/m ²)	25.1 : 44.7 (5.63) : (10.02)				Burned area After 1 h (acres)	0	1	0.2	0.05
						10	83	13	3
						20	280	28	3
					Head fire	0	2	1	1
					Flame length	10	8	4	3
					(feet)	20	13	6	4
					Crown scorch	0	8	3	2
					By head fire	10	33	7	3
					(feet)	20	51	9	3
					Head fire	0	21	6	3
					Intensity	10	451	107	46
					(Btu/ft/s)	20	1482	326	121

PRECOMMERCIAL THINNING INFORMATION	
Stems cut/acre	5642 (Avg. d.b.h. 2")
Stems remaining per acre	436
Average d.b.h. before (inches)	2
Average d.b.h. after (inches)	4
Basal area/acre before	161
Basal area/acre after	38
Thinning method	Chainsaw
Slash treatment	None

OTHER INFORMATION	
Slash age	2 months
Average slope	50 percent
Species composition: WH 70%, WL 20%, ES 10%	

FUEL QUANTITY	
IDAH0 FOREST PRACTICE ACT SLASH HAZARD POINTS	60



GRAND FIR SIZE CLASS 1 PRECOMMERCIAL THINNING

Reminders to users:

1. The marker in these photos is 1 foot (0.3048 m) square, and the pole is painted in contrasting colors at 1-foot (0.3048-m) intervals to provide scale.
2. Stumps are not included in debris quantities.
3. Rotten debris is that which would come apart or splinter when kicked.
4. Potential fire behavior is for low fuel moisture and 20% slope.
5. Windspeed is taken at 20 feet (6.1 m) above the ground.



1-GF-1-TH

DATA SHEET

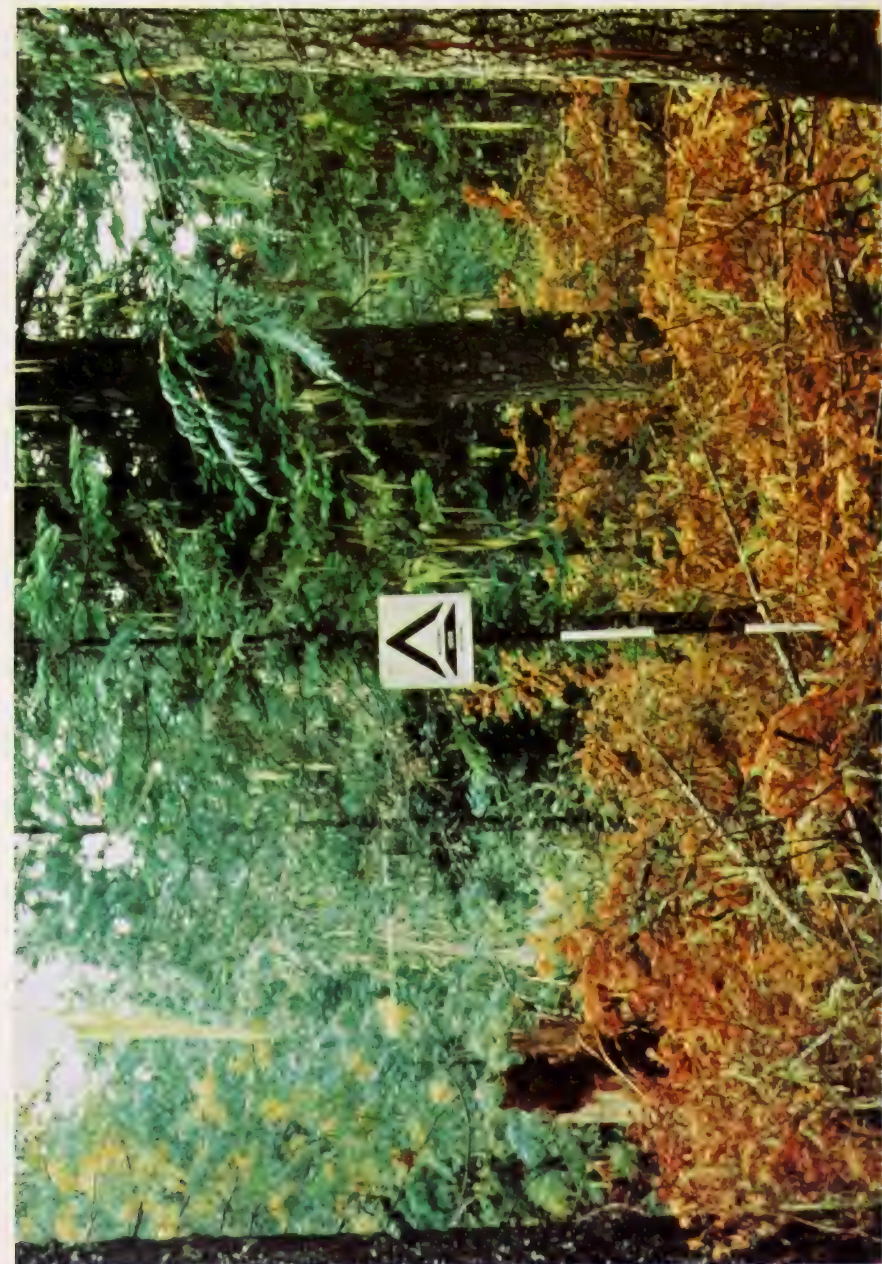
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DEBRIS LOADING			UTILIZATION POTENTIAL OF DEBRIS LARGER THAN 3-INCH DIAMETER		POTENTIAL FIRE BEHAVIOR ASSESSMENT							
Size Class (inches)	Weight (tons/acre)		Volume 150 <u>ft³/ac</u> (10.5 m ³ /ha)	Percent sound <u>0</u> %	Percent rotten <u>100</u> %	Avg. diameter: sound <u>---</u> in	Sound & rotten <u>3.4</u> in (8.6 cm)	Quantity Assessed	Slash Age In No. Of Winters			
	Slash : Total Only : Debris	1.6 : 1.6							1.6 : 2.4	1.9 : 3.2	0 : 1.4	0 : 0
0-0.25								Head fire	0	0.6	0.3	0.2
0.25-1.0								Spread rate (ch/h)	10	10	4	2
1.1-3.0								20	27	11	5
3.1-10.0								Perimeter	0	3	1	2
10.1-20.0								Growth rate (ch/h)	10	27	9	19
20.1+								20	35	9	21
								Burned area After 1 h (acres)	0	.05	0.01	0.01
								10	3	0.4	0.1
								20	3	0.4	0.1
								Head fire	0	1	0.5	0.4
								Flame length (feet)	10	3	2	1
								20	4	2	2
								Crown scorch	0	2	1	1
								By head fire (feet)	10	3	1	0.5
								20	3	1	0.5
								Head fire	0	3	1	1
								Intensity	10	51	15	10
								(Bcu/ft/s)	20	135	38	21

PRECOMMERCIAL THINNING INFORMATION	
Stems cut/acre	3396 (Avg. d.b.h. <1")
Stems remaining per acre	440
Average d.b.h. before (inches)	1
Average d.b.h. after (inches)	3
Basal area/acre before	48
Basal area/acre after	29
Thinning method	Chainsaw
Slash treatment	None

OTHER INFORMATION	
Slash age	12 months
Average slope	40 percent
Species composition:	GF 100%

FUEL QUANTITY	
IDAHO FOREST PRACTICE ACT SLASH HAZARD POINTS	18



2-GF-1-TH

DATA SHEET

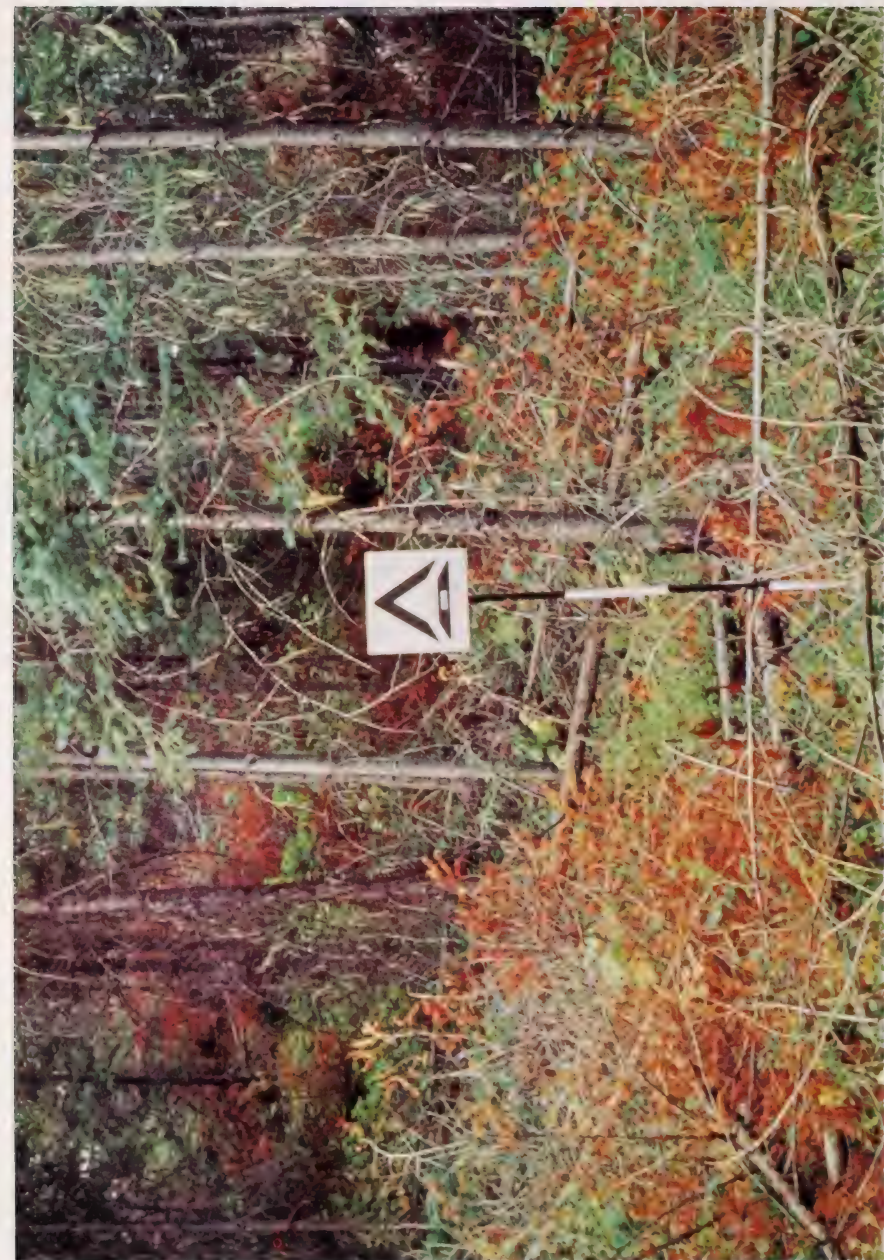
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DEBRIS LOADING			UTILIZATION POTENTIAL OF DEBRIS LARGER THAN 3-INCH DIAMETER		POTENTIAL FIRE BEHAVIOR ASSESSMENT							
Size Class (inches)	Weight (tons/acre)		Volume 364 ft ³ /ac (25.5 m ³ /ha)	Percent sound 0 %	Percent rotten 100 %	Avg. diameter: sound --- in	Sound & rotten 6.1 in (15.5 cm)	Quantity Assessed	Wind mi/h	Slash Age In No. Of Winters		
	Slash : Total	Only : Debris								1	3	5
0-0.25	2.2	2.2						Head fire	0	1	0.7	0.6
0.25-1.0	1.5	2.6						Spread rate (ch/h)	10	23	11	7
1.1-3.0	4.9	6.9							20	60	27	14
3.1-10.0	0	1.5						Perimeter	0	5	3	2
10.1-20.0	0	1.9						Growth rate (ch/h)	10	58	28	17
20.1+	0	0							20	137	45	25
								Burned area After 1 h	0	0.2	0.1	0.05
								(acres)	10	17	4	1
									20	37	4	1
								Head fire	0	1	1	1
								Flame length (feet)	10	5	3	3
									20	8	5	4
								Crown scorch	0	5	3	3
								By head fire	10	13	5	4
								(feet)	20	16	5	3
								Head fire	0	11	5	5
								Intensity	10	193	73	60
								(Btu/ft/s)	20	513	180	127

PRECOMMERCIAL THINNING INFORMATION	
Stems cut/acre	5472 (Avg. d.b.h. 1")
Stems remaining per acre	491
Average d.b.h. before (inches)	1
Average d.b.h. after (inches)	5
Basal area/acre before	196
Basal area/acre after	77
Thinning method	Chainsaw
Slash treatment	None

OTHER INFORMATION	
Slash age	3 months
Average slope	10 percent
Species composition: GF 95%, WWP 5%	

IDAHO FOREST PRACTICE ACT SLASH HAZARD POINTS	
FUEL QUANTITY	29



3-GF-1-TH

DATA SHEET

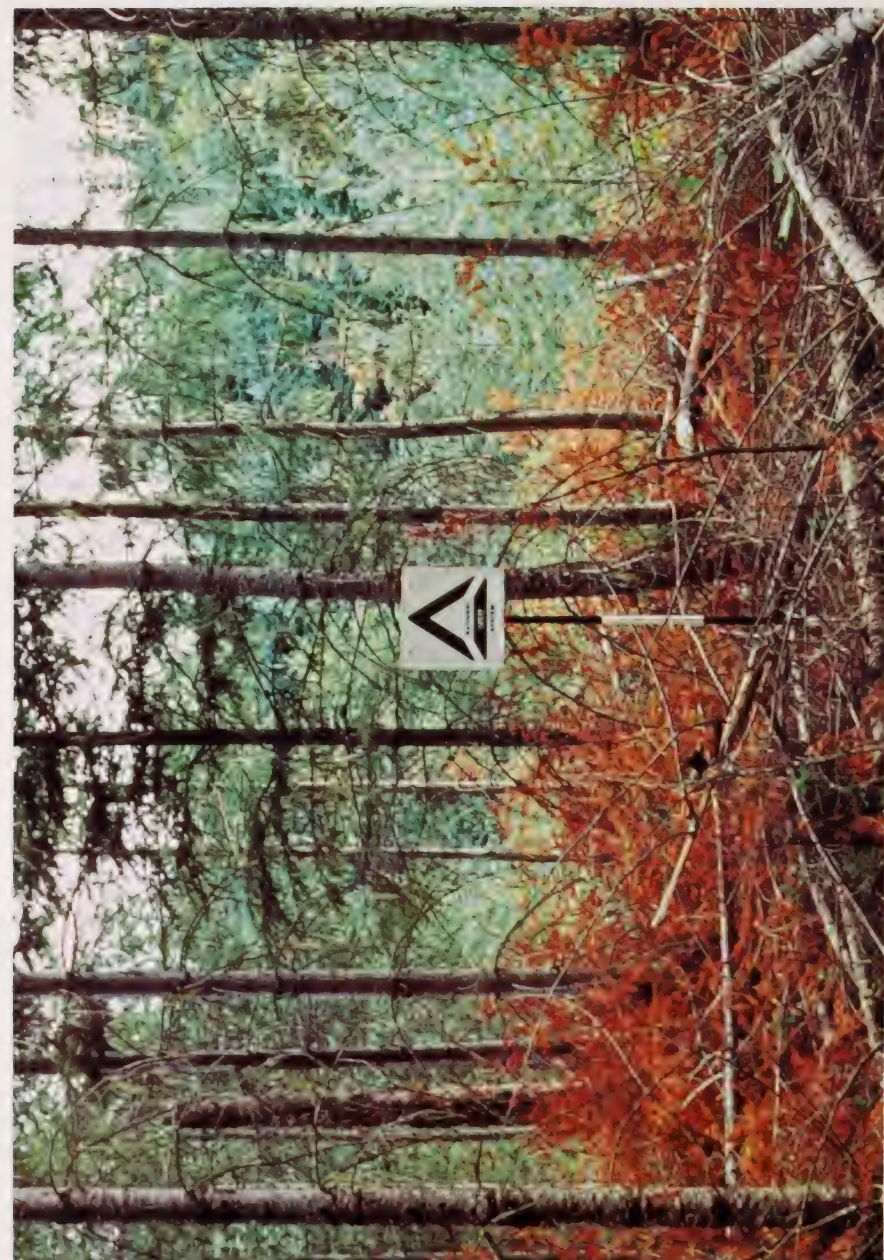
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DEBRIS LOADING			UTILIZATION POTENTIAL OF DEBRIS LARGER THAN 3-INCH DIAMETER		POTENTIAL FIRE BEHAVIOR ASSESSMENT				
Size Class (Inches)	Weight (tons/acre)		Volume 514 ft ³ /ac (38.0 m ³ /ha)	514 ft ³ /ac (38.0 m ³ /ha)	Quantity Assessed	Wind mi/h	Slash Age In No. Of Winters		
	Slash : Total	Only : Debris					1	3	5
0-0.25	3.8	3.8			Head fire	0	2	1	0.5
0.25-1.0	2.5	2.7			Spread rate (ch/h)	10	38	15	7
1.1-3.0	4.9	6.0				20	104	39	17
3.1-10.0	5.5	6.2			Perimeter	0	9	4	2
10.1-20.0	0	0			Growth rate (ch/h)	10	98	39	19
20.1+	0	0				20	237	83	24
					Burned area After 1 h (acres)	0	1	0.1	0.05
						10	47	8	2
						20	111	14	2
					Head fire	0	2	1	1
					Flame length (feet)	10	8	4	3
						20	12	6	4
					Crown scorch	0	9	4	2
					By head fire	10	34	7	3
					(feet)	20	44	8	3
					Head fire	0	26	7	4
					Intensity	10	469	112	49
					(Btu/ft/s)	20	1285	290	112

PRECOMMERCIAL THINNING INFORMATION	
Stems cut/acre	3084 (Avg. d.b.h. 2")
Stems remaining per acre	390
Average d.b.h. before (inches)	2
Average d.b.h. after (inches)	4
Basal area/acre before	101
Basal area/acre after	34
Thinning method	Chainsaw
Slash treatment	None

OTHER INFORMATION	
Slash age	13 months
Average slope	10 percent
Species composition:	GF 70%, DF 30%

IDAHO FOREST PRACTICE ACT SLASH HAZARD POINTS	
FUEL QUANTITY	50



4-GF-1-TH

DATA SHEET

CODE: 4-CF-1-TH

DEBRIS LOADING		UTILIZATION POTENTIAL OF DEBRIS LARGER THAN 3-INCH DIAMETER		POTENTIAL FIRE BEHAVIOR ASSESSMENT					
Size Class (inches)	Weight (tons/acre) Slash : Total Only : Debris	Volume 2386 ft^3/ac (166.9 m^3/ha)	Percent sound	Percent rotten	Avg. diameter:	Quantity Assessed	Wind mi/h	Slash Age In No. Of Winters 1 3 5	
0-0.25	4.3 : 4.3		26 %			Head fire	0	2 1	
0.25-1.0	3.6 : 3.9					Spread rate (ch/h)	10 44 20 120	4 19 10 22	
1.1-3.0	7.7 : 8.4			74 %		Perimeter	0	10 5	
3.1-10.0	3.6 : 9.1					Growth rate (ch/h)	10 115 20 276	48 26 109 50	
10.1-20.0	0 : 14.9					.....	.....	.....
20.1+	0 : 0					Burned area After 1 h (acres)	0 1 10 65 20 149	0.2 11 23 5	
TOTAL (kg/m^2)	19.2 : 40.2 (4.30) : (9.01)		sound 3.7 in (9.4 cm)			Head fire	0 2	1 1	
			Sound & rotten 5.7 in (14.5 cm)			Flame length (feet)	10 9 20 14	5 4 8 6	
PRECOMMERCIAL THINNING INFORMATION									
Stems cut/acre	3494 (Avg. d.b.h. 2")								
Stems remaining per acre	390								
Average d.b.h. before (inches)	2								
Average d.b.h. after (inches)	4								
Basal area/acre before	110								
Basal area/acre after	34								
Thinning method	Chainsaw								
Slash treatment	None								
OTHER INFORMATION									
Slash age	12 months								
Average slope	0 percent								
Species composition: GF 70%, DF 30%									

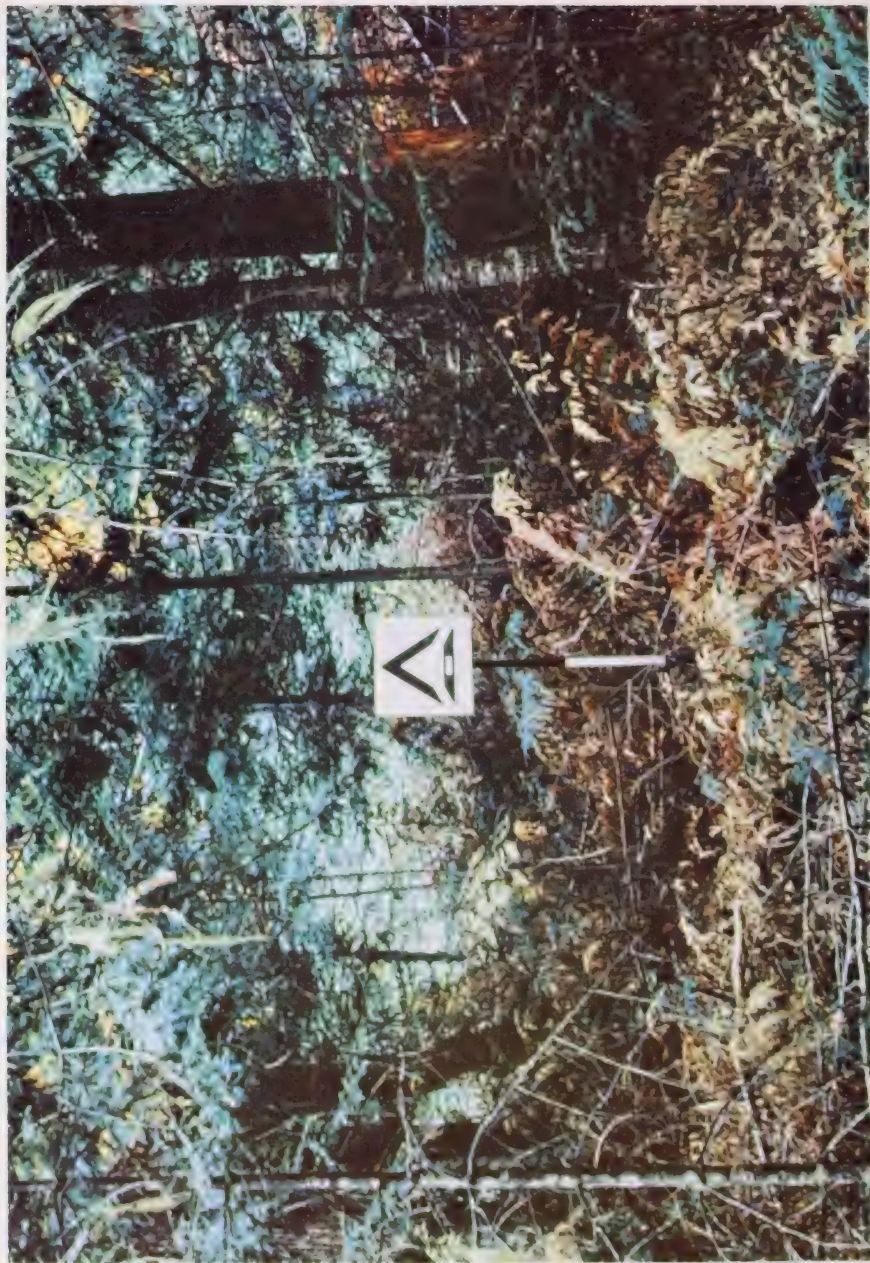
IDAHO FOREST PRACTICE ACT SLASH HAZARD POINTS	FUEL QUANTITY 52
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**WESTERN REDCEDAR
SIZE CLASS 1
PRECOMMERCIAL THINNING**

Reminders to users:

1. The marker in these photos is 1 foot (0.3048 m) square, and the pole is painted in contrasting colors at 1-foot (0.3048-m) intervals to provide scale.
2. Stumps are not included in debris quantities.
3. Rotten debris is that which would come apart or splinter when kicked.
4. Potential fire behavior is for low fuel moisture and 20% slope.
5. Windspeed is taken at 20 feet (6.1 m) above the ground.



DATA SHEET

CODE: 1-WC-1-TH

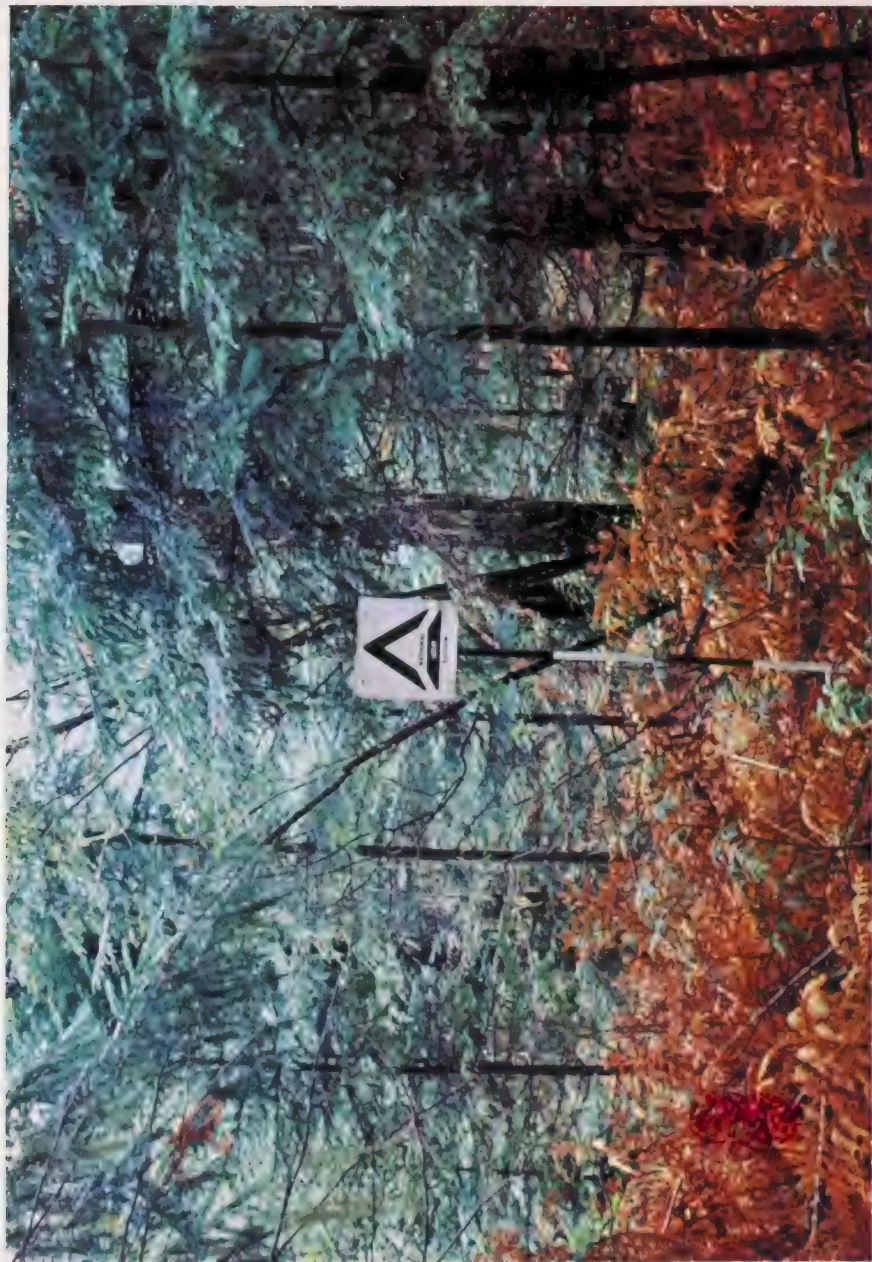
DEBRIS LOADING		UTILIZATION POTENTIAL OF DEBRIS LARGER THAN 3-INCH DIAMETER		POTENTIAL FIRE BEHAVIOR ASSESSMENT				
Size Class (inches)	Weight (tons/acre) Slash : Total Only : Debris	Volume	951 ft ³ /ac (66.5 m ³ /ha)	Quantity Assessed	Wind mi/h		Slash Age In No. Of Winters	
					0	1	3	5
0-0.25	0.8 : 0.8	Percent sound	0 %	Head fire (ch/h)	0	0.6	0.4	0.3
0.25-1.0	1.7 : 2.2	Percent rotten	100 %	Spread rate (ch/h)	10	9	5	3
1.1-3.0	0.9 : 1.8	Avg. diameter:		Perimeter (ch/h)	0	3	2	1
3.1-10.0	0 : 2.0			Growth rate (ch/h)	10	24	12	7
10.1-20.0	0 : 6.9				20	24	12	7
20.1+	0 : 0	sound	in					
				Burned area After 1 h (acres)	0	0.05	0.02	0.01
					10	3	1	0.3
					20	3	1	0.3
				Head fire Flame length (feet)	0	1	1	1
					10	4	3	3
					20	5	4	3
				Crown scorch	0	4	3	2
				By head fire	10	7	5	3
				(feet)	20	5	3	2
				Head fire	0	7	5	4
				Intensity	10	105	74	54
				(Btu/ft/s)	20	188	113	78

PRECOMMERCIAL THINNING INFORMATION	
Stems cut/acre	2800 (Avg. d.b.h. <1")
Stems remaining per acre	426
Average d.b.h. before (inches)	1
Average d.b.h. after (inches)	4
Basal area/acre before	54
Basal area/acre after	39
Thinning method	Chainsaw
Slash treatment	None

OTHER INFORMATION	
Slash age	4 months
Average slope	20 percent
Species composition: WC 95%, GF 5%	

FUEL QUANTITY	
10	

IDAH0 FOREST PRACTICE ACT SLASH HAZARD POINTS	
FUEL QUANTITY	



DATA SHEET

CODE: 2-WC-1-TH

DEBRIS LOADING		UTILIZATION POTENTIAL OF DEBRIS LARGER THAN 3-INCH DIAMETER		POTENTIAL FIRE BEHAVIOR ASSESSMENT				
Size Class (inches)	Weight (tons/acre) Slash : Total Only : Debris	Volume $\frac{171 \text{ ft}^3/\text{ac}}{(12.0 \text{ m}^3/\text{ha})}$	$\frac{171 \text{ ft}^3/\text{ac}}{(12.0 \text{ m}^3/\text{ha})}$	Quantity Assessed	Wind mi/h	Slash Age In No. Of Winters <u>1</u> <u>3</u> <u>5</u>		
0-0.25	1.3 : 1.3			Head fire	0	1	0.5	0.3
0.25-1.0	2.5 : 2.5	Percent sound	100 %	Spread rate (ch/h)	10	15	8	5
1.1-3.0	1.5 : 1.5	Percent rotten	0 %	.....	20	28	12	7
3.1-10.0	0 : 1.6			Perimeter	0	4	2	1
10.1-20.0	0 : 0	Avg. diameter:		Growth rate (ch/h)	10	39	19	11
20.1+	0 : 0	sound	$\frac{3.9}{(9.9 \text{ cm})}$ in	.....	20	53	19	11
	0 : 0	Sound & rotten	$\frac{3.9}{(9.9 \text{ cm})}$ in	.....			
TOTAL (kg/m^2)				5.3 : 6.9 (1.19) : (1.55)				
PRECOMMERCIAL THINNING INFORMATION								
Stems cut/acre		4300 (Avg. d.b.h. <1")						
Stems remaining per acre		426						
Average d.b.h. before (inches)		1						
Average d.b.h. after (inches)		4						
Basal area/acre before		62						
Basal area/acre after		39						
Thinning method		Chainsaw						
Slash treatment		None						
OTHER INFORMATION								
Slash age		4 months						
Average slope		10 percent						
Species composition:		WC 70%, GF 30%						

IDAHO FOREST PRACTICE ACT

SLASH HAZARD POINTS

FUEL QUANTITY 16



3-WC-1-TH

DATA SHEET

CODE: 3-WC-1-TH

DEBRIS LOADING			UTILIZATION POTENTIAL OF DEBRIS LARGER THAN 3-INCH DIAMETER		POTENTIAL FIRE BEHAVIOR ASSESSMENT						
Size Class (inches)	Weight (tons/acre)		Volume 4296 ft ³ /ac (300.6 m ³ /ha)	Percent sound 16 %	Percent rotten 84 %	Avg. diameter:	Quantity Assessed	Slash Age In No. Of Winters			
	Slash : Total	Only : Debris						1	3	5	
0-0.25	1.5	1.5					Head fire	0	1	0.8	0.5
0.25-1.0	3.5	4.3					Spread rate (ch/h)	10	17	10	6
1.1-3.0	4.4	5.7						20	30	16	9
3.1-10.0	1.2	8.8					Perimeter	0	5	3	2
10.1-20.0	0	32.8					Growth rate (ch/h)	10	45	27	17
20.1+	0	0						20	70	33	18
			sound	4.4 in (1.2 cm)			Burned area After 1 h (acres)	0	0.2	0.1	0.04
			Sound & rotten	8.0 in (20.3 cm)				20	10	4	1
tons/acre	10.6	53.1					Head fire	0	2	2	2
TOTAL (kg/m ²)	(2.38)	(11.90)					Flame length (feet)	10	7	7	6
								20	10	8	7
PRECOMMERCIAL THINNING INFORMATION											
Stems cut/acre	2552 (Avg. d.b.h. 2")										
Stems remaining per acre	491										
Average d.b.h. before (inches)	2										
Average d.b.h. after (inches)	5										
Basal area/acre before	133										
Basal area/acre after	77										
Thinning method	Chainsaw										
Slash treatment	None										
OTHER INFORMATION											
Slash age	3	months									
Average slope	0	percent									
Species composition: WC 75%, GF 25%											
IDAH0 FOREST PRACTICE ACT SLASH HAZARD POINTS											
FUEL QUANTITY			39								



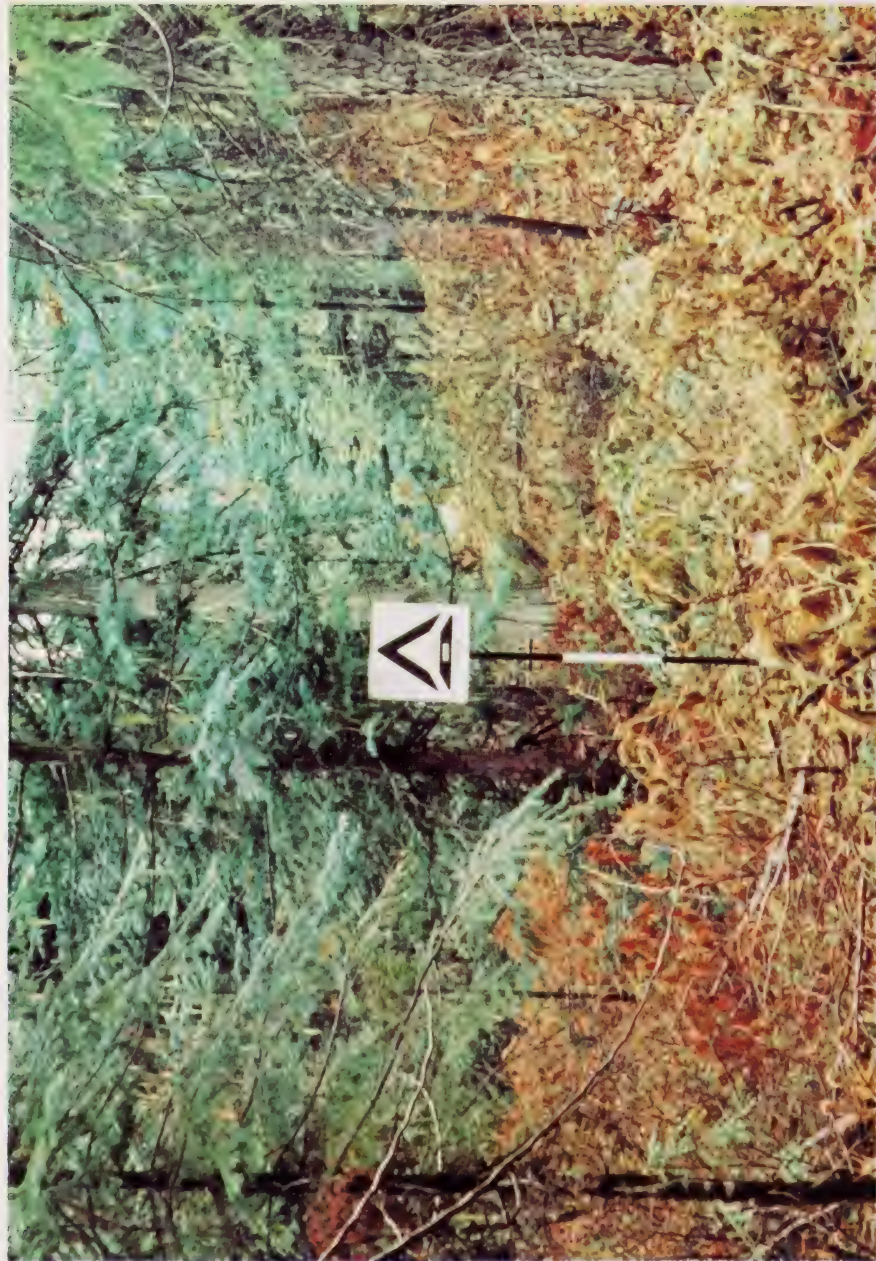
DATA SHEET

CODE: 4-WC-1-TH

DEBRIS LOADING			UTILIZATION POTENTIAL OF DEBRIS LARGER THAN 3-INCH DIAMETER		POTENTIAL FIRE BEHAVIOR ASSESSMENT						
Size Class (inches)	Weight (tons/acre)		Volume $652 \text{ ft}^3/\text{ac}$ ($45.6 \text{ m}^3/\text{ha}$)	Percent sound 0 %	Percent rotten 100 %	Avg. diameter:	Quantity Assessed	Wind mi/h	Slash Age In No. Of Winters		
	Slash : Total	Only : Debris							1	3	5
0-0.25	1.3	1.3					Head fire	0	1	0.8	0.5
0.25-1.0	3.9	4.6					Spread rate (ch/h)	10	21	12	7
1.1-3.0	6.3	6.9					.....	20	36	17	9
3.1-10.0	0	6.1					Perimeter	0	6	3	2
10.1-20.0	0	0					Growth rate (ch/h)	10	53	31	18
20.1+	0	0					.....	20	82	36	18
				sound		in	Burned area After 1 h (acres)	0	0.3	0.1	0.03
				Sound & rotten	8.3	in	.....	10	14	5	2
						(21.1 cm)	.....	20	14	5	2
							Head fire	0	2	2	2
							Flame length (feet)	10	8	7	6
							.....	20	11	9	7
						
							Crown scorch	0	11	9	7
							By head fire (feet)	10	41	30	19
							.....	20	33	19	10
						
							Head fire	0	37	38	19
							Intensity	10	574	422	263
							(Btu/ft/s)	20	990	614	360
OTHER INFORMATION											
Slash age 3 months Average slope 10 percent Species composition: WC 90%, GF 10%											

 IDAHO FOREST PRACTICE ACT
 SLASH HAZARD POINTS

FUEL QUANTITY 40



DATA SHEET

CODE: 5-WC-1-TH

DEBRIS LOADING			UTILIZATION POTENTIAL OF DEBRIS LARGER THAN 3-INCH DIAMETER		POTENTIAL FIRE BEHAVIOR ASSESSMENT							
Size Class (inches)	Weight (tons/acre)	Slash : Total		Volume 889 ft^3/ac (62.2 m^3/ha)	Percent sound	Percent rotten	Avg. diameter:	Quantity Assessed	Wind mi/h	Slash Age In No. Of Winters		
		Only	Debris							1	3	5
0-0.25	1.9	:	1.9		46 %			Head fire	0	1	1	0.5
0.25-1.0	3.6	:	4.7					Spread rate (ch/h)	10	16	10	6
1.1-3.0	5.1	:	5.4						20	25	15	9
3.1-10.0	1.8	:	8.4					Perimeter	0	5	3	2
10.1-20.0	0	:	1.0					Growth rate (ch/h)	10	41	25	16
20.1+	0	:	0						20	65	34	19
		:						Burned area	0	0.2	0.1	0.04
		:						After 1 h	10	8	3	1
		:						(acres)	20	8	3	1
		:						Head fire	0	2	2	2
		:						Flame length	10	7	7	6
		:						(feet)	20	10	8	7
		:						Crown scorch	0	10	9	8
		:						By head fire	10	32	25	19
		:						(feet)	20	25	16	11
		:						Head fire	0	32	27	23
		:						Intensity	10	442	350	265
		:						(Btu/ft/s)	20	789	532	376
PRECOMMERCIAL THINNING INFORMATION												
Stems cut/acre					2850 (Avg. d.b.h. 2")							
Stems remaining per acre					491							
Average d.b.h. before (inches)					2							
Average d.b.h. after (inches)					5							
Basal area/acre before					139							
Basal area/acre after					77							
Thinning method					Chainsaw							
Slash treatment					None							
OTHER INFORMATION												
Slash age					3 months							
Average slope					10 percent							
Species composition:					WC 55%, GF 23%, WWP 22%							
IDAH0 FOREST PRACTICE ACT SLASH HAZARD POINTS					FUEL QUANTITY 39							



6-WC-1-TH

DATA SHEET

CODE: 6-WC-1-TH

DEBRIS LOADING		UTILIZATION POTENTIAL OF DEBRIS LARGER THAN 3-INCH DIAMETER		POTENTIAL FIRE BEHAVIOR ASSESSMENT				
Size Class (inches)	Weight (tons/acre)	Volume		Quantity Assessed	Wind mi./h	Slash Age In No. Of Winters		
		218L ft ³ /ac (162.6 m ³ /ha)	51 %			1	3	5
0-0.25	4.7 : 4.7	Percent sound	51 %	Head fire	0	3	1	1
0.25-1.0	4.1 : 4.1	Percent rotten	49 %	Spread rate (ch/h)	10	42	16	10
1.1-3.0	6.8 : 6.8	Avg. diameter:		Perimeter	0	11	5	3
3.1-10.0	11.8 : 16.2	sound	3.7 in (9.4 cm)	Growth rate (ch/h)	10	108	42	27
10.1-20.0	0 : 7.2	Sound & rotten	4.5 in (11.4 cm)		20	180	62	37
20.1+	0 : 0			Burned area After 1 h	0	1	0.2	0.1
tons/acre	27.4 : 39.0			(acres)	10	58	9	4
TOTAL (kg/m ²)	(6.14) : (8.74)				20	64	9	4
PRECOMMERCIAL THINNING INFORMATION				Head fire	0	4	2	2
Stems cut/acre				Flame length (feet)	10	15	8	7
Stems remaining per acre					20	19	10	8
Average d.b.h. before (inches)								
Average d.b.h. after (inches)								
Basal area/acre before								
Basal area/acre after								
Thinning method								
Slash treatment								
OTHER INFORMATION				Crown scorch	0	25	10	9
Slash age 2 months				By head fire	10	124	35	25
Average slope 0 percent				(feet)	20	129	26	17
Species composition: WC 50%, GF 50%								
				Head fire	0	122	33	26
				Intensity	10	1903	482	354
				(8tu/ft/s)	20	3586	803	552

 IDAHO FOREST PRACTICE ACT
 SLASH HAZARD POINTS

FUEL QUANTITY 60



DATA SHEET

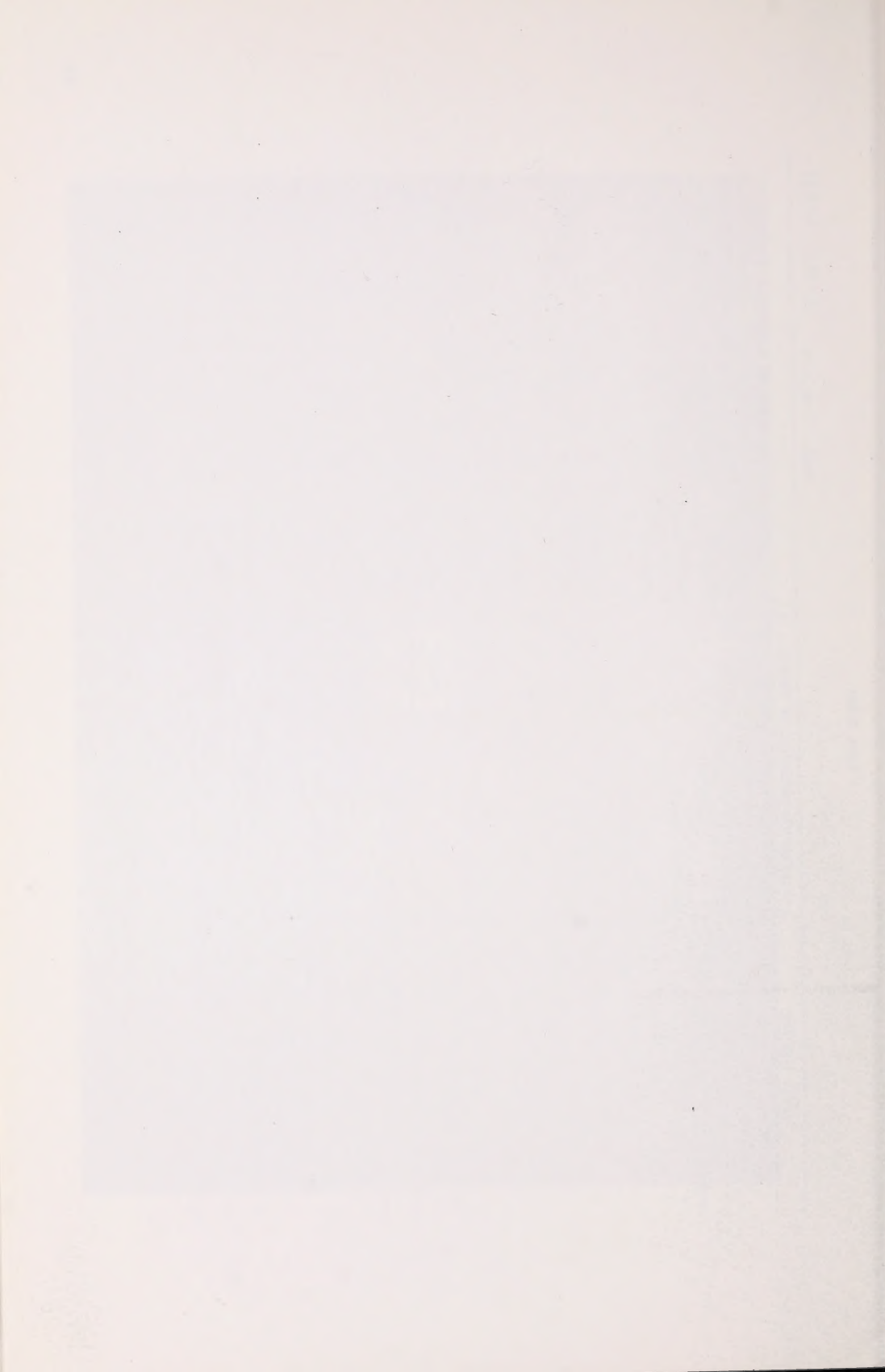
CODE: 7-WC-1-TH

DEBRIS LOADING			UTILIZATION POTENTIAL OF DEBRIS LARGER THAN 3-INCH DIAMETER		POTENTIAL FIRE BEHAVIOR ASSESSMENT									
Size Class (inches)	Weight (tons/acre)	Slash : Total		Volume 3136 $\frac{\text{ft}^3}{\text{ac}}$ (219.4 $\frac{\text{m}^3}{\text{ha}}$)	Percent sound 57 %	Percent rotten 43 %	Avg. diameter:	Quantity Assessed	Wind mi/h	Slash Age In No. Of Winters				
		Only	Debris							1	2	3	4	5
0-0.25	6.0	:	6.0					Head fire	0		1		1	
0.25-1.0	5.9	:	6.4					Spread rate (ch/h)	10		28		9	
1.1-3.0	11.4	:	13.9						20		52		23	
3.1-10.0	16.3	:	23.0										14	
10.1-20.0	2.6	:	11.3											
20.1+	0	:	0					Perimeter	0		10		5	
		:						Growth rate (ch/h)	10		72		36	
		:							20		118		52	
		:											315	
		:						Burned area	0		1		0.2	
		:						After 1 h	10		26		6	
		:						(acres)	20		27		6	
		:											3	
		:						Head fire	0		4		3	
		:						Flame length	10		14		10	
		:						(feet)	20		19		13	
		:											11	
		:												
		:						Crown scorch	0		27		18	
		:						By head fire	10		117		60	
		:						(feet)	20		118		47	
		:											32	
		:												
		:						Head fire	0		143		75	
		:						Intensity	10		1780		850	
		:						(Btu/ft/s)	20		3283		1367	
		:											980	

PRECOMMERCIAL THINNING INFORMATION	
Stems cut/acre	4146 (Avg. d.b.h. 3")
Stems remaining per acre	491
Average d.b.h. before (inches)	3
Average d.b.h. after (inches)	5
Basal area/acre before	280
Basal area/acre after	77
Thinning method	Chainsaw
Slash treatment	None

OTHER INFORMATION	
Slash age	4 months
Average slope	0 percent
Species composition: GF 60%, WC 30%, DF 5%, WWP 5%	

IDAHO FOREST PRACTICE ACT	
SLASH HAZARD POINTS	
FUEL QUANTITY	60



Koski, Wayne H., and William C. Fischer.

1979. Photo series for appraising thinning slash in north Idaho: western hemlock, grand fir, and western redcedar timber types. USDA For. Serv. Gen. Tech. Rep. INT-46, 50 p. Intermt. For. and Range Exp. Stn., Ogden, Utah 84401.

Three series of color photographs show different levels of down woody material resulting from precommercial thinning operations in three north Idaho timber types. Each photo is supplemented by inventory data describing the size, weight, and volume of the debris pictured. Stand data relating to the thinning operation are provided and estimates of predicted fire behavior and Idaho Forest Practice Act slash hazard rating are given.

KEYWORDS: slash, forest fuels, thinning, fire behavior, fire hazard

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